CATALUNYA ESCAPE LUR MODEL PERFORMANCE IN COMPARISON TO LOCALLY DEVELOPED MODELS.

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Background: The crux of ESCAPE (European Study of Cohorts for Air Pollution Effects) is uniform air pollution exposure assessment methodologies applied to 37 study areas across Europe. Land Use Regression (LUR) models are developed for within-city to large regional scales to capture air pollution spatial variability. Catalunya, Spain, presents interesting opportunities to compare the large area ESCAPE model with two LUR models estimated specifically for local cohorts. Our aim is to compare ESCAPE NO_2 models with more measurement-intensive locally-derived LURs, keeping in mind different modelling philosophies in the three projects.

Methods: The Catalan ESCAPE LUR model domain is 513 km^2, including the Sabadell-INMA study area (38km^2), and the REGICOR region of Girona (375km^2, including 12 towns). We discuss differences in methodologies (monitoring campaign spatial-temporal coverage, NO_2 samplers, input variables) to contextualize contrasting model results. We regress the three model outputs against values measured from the project monitoring campaigns, and against predictions made at cohort subjects' addresses. Further we will: estimate Pearson's correlations and Bland&Altman plots testing agreement between different measures, visualize spatial patterns of discrepancies between models, and perform stratified analyses comparing conditions affecting model performance (urban, rural, semi-urban, high-to-low traffic).

Results: The Catalan ESCAPE LUR model, based on 80 measurement-sites, has a leave-one-out crossvalidation R^2 of 0.69. Initial results show that it explains in Sabadell 55% of the variability in the 57 INMA measurement-sites, and 31% of the 547 REGICOR measurements. The Sabadell model explained 74% and the REGICOR model 47% of the variability measured at the ESCAPE sites.

Conclusion: The region-wide ESCAPE model explains less variability in measured NO2 in Sabadell and Girona region than suggested by the cross-validation R2. It explains more variance in our within-city than our larger regional scale context. Further analyses are being conducted. We discuss result interpretations given contrasting model development contexts, and lessons learned for ESCAPE model applications.